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Megacollybia virosa, a new species with toxic basidiomata from India

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Abstract —*Megacollybia virosa* sp. nov. is described and illustrated from Kerala State, India. Basidiomata of this species when eaten produce severe gastrointestinal upset.

Key words — *Agaricales, Basidiomycota,* poisonous mushroom, taxonomy

Introduction

The genus *Megacollybia* Kotl. & Pouzar (*Marasmiaceae, Agaricales, Basidiomycota*) was originally proposed for *M. platyphylla* (Pers.) Kotl. & Pouzar, a species that had been placed in several genera such as *Collybia* (Fr.) Staude, *Clitocybula* (Singer) Singer ex Métrod, *Hydropus* Kühner ex Singer, *Oudemansiella* Speg., and *Tricholomopsis* Singer. Until recently, *Megacollybia* had been treated as monotaxic. ITS-based phylogenetic reconstruction, combined with macro- and micromorphological analyses, however, resulted in the recognition of six additional species and the transfer of *Tricholomopsis fallax* A.H. Sm. to *Megacollybia* (Hughes et al. 2007). Collybioid to clitocyboid or tricholomatoid basidiomata; fibrillose and finely radially streaked or rarely minutely scabrous to minutely squamulose pileal surface; white pileal trama often showing greatly inflated tramal hyphae; adnexed to adnate lamellae usually with a decurrent tooth; thin-walled, ellipsoid to somewhat ovate, inamyloid basidiospores that fit within a narrow range of dimensions, 6–10 × 5–7 µm; basidia that fit generally within 35–43 × 8–11 µm; somewhat regular lamellar trama that exhibits large areas of intricately interwoven hyphae;

plentiful cheilocystidia; and conspicuous clamp connections are characteristics of this genus (Hughes et al. 2007). The genus appears to be predominantly North Temperate in distribution (Hughes et al. 2007).

While studying the agarics of Kerala State, India, we came across an agaric that fits well in the current circumscription of *Megacollybia*. It seems to be quite distinct from all the other eight species so far described in that genus. Remarkably, the basidiomata of this species when eaten produce severe gastrointestinal upset. It is described here as a new species along with an account of the poisoning caused by it.

Materials and methods

Conventional morphology-based taxonomic methods were employed for this study. Microscopic observations were made on material stained with 1% aqueous solutions of phloxine and Congo red and mounted in 3% aqueous KOH. Melzer's reagent was used to observe whether the spores were amyloid. Twenty basidiospores per specimen were measured. Colour codes refer to Kornerup & Wanscher (1978). All examined collections cited are deposited at the Herbarium of the University of Tennessee (TENN).

Taxonomic account

Megacollybia virosa Manim. & K.B. Vrinda, **sp. nov.** FIGURE 1, 2 A–E

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Basidioma clitocyboidea, robusta. Pileus 45–100 mm latus, convexus vel plano-convexus, brunneus, griseo-brunneus vel atro griseus, pruinosus vel granulatus. Lamellae adnatae vel decurrentes, confertae, albidae. Stipes 20–75 × 5–23 mm, albidus, squamuloso griseo-brunneo punctatus. Odore ingrato. Sporae 6.5–11(–12) × 5–7 µm, subglobosae vel ellipsoideae, inamyloidiae. Basidia 23–56 × 7.5–11 µm, clavata, 4-sporigera. Acies lamellarum sterilis. Cheilocystidia 20–63 × 5.5–9 µm, cylindracea, cylindrico-clavata vel ventricoso-rostrata, ad apicem subcapitata et exsudato glutinoso instructa, hyalina. Pleurocystidia nulla. Trama hymenophoralis subregularis, hyalina. Epicutis pilei disrupta, ex hyphis repentibus et hyphis erectis composita. Hyphae omnes fibulatae.

HOLOTYPE — INDIA, KERALA STATE, Calicut District, PUTHIYANGADI: 12 June. 2006, T.K. Arun Kumar AK395 (TENN63392).

ETYMOLOGY: *virosa* (Latin), poisonous

BASIDIOMATA medium-sized, fleshy, clitocyboid. PILEUS 45–100 mm diam., convex, becoming broadly convex; surface light brown (6D5), brown (6E4), greyish brown (7E3), or dark grey (7F8), slightly darker at the centre, pruinose to somewhat granular to naked eye, with fine appressed scales under a lens, dry; margin inrolled when very young, becoming incurved and finally becoming straight, initially entire, becoming fissile with age. LAMELLAE adnate to decurrent, moderately crowded, with lamellulae in four to eight tiers, up to

FIGURE 1. Basidiomata of *Megacollybia virosa*.

9 mm thick, whitish to yellowish white (1A2); edge smooth to finely fimbriate under a lens. STIPE 20–75 × 5–23 mm, central or at times slightly excentric, terete to slightly compressed, almost equal with a dilated apex, solid, with white basal mycelium; surface dull white with fine, light brown (6D5), greyish brown (7E3) or dark grey granular squamules that are concentrated towards the base and disappearing easily when handled. CONTEXT up to 20 mm thick, white. ODOUR strong and unpleasant. SPORE-PRINT white.

BASIDIOSPORES 6.5–11(–12) × 5–7 µm, subglobose to ellipsoid, thin-walled, smooth, with refractive guttules, inamyloid. BASIDIA 23–56 × 7.5–11 µm, cylindrico-clavate to clavate, thin-walled, hyaline, with granular contents, 4-spored; sterigmata up to 5 µm long. LAMELLA-EDGE sterile. CHEILOCYSTIDIA abundant, 20–63 × 5.5–9 µm, clavate, cylindrico-clavate, or ventricose, majority with a small capitellum on a slender neck up to 35 µm long, often septate, thin-walled, hyaline to pale yellowish, apex sometimes covered with glutinous exudates. PLEUROCYSTIDIA absent. LAMELLAR TRAMA regular to

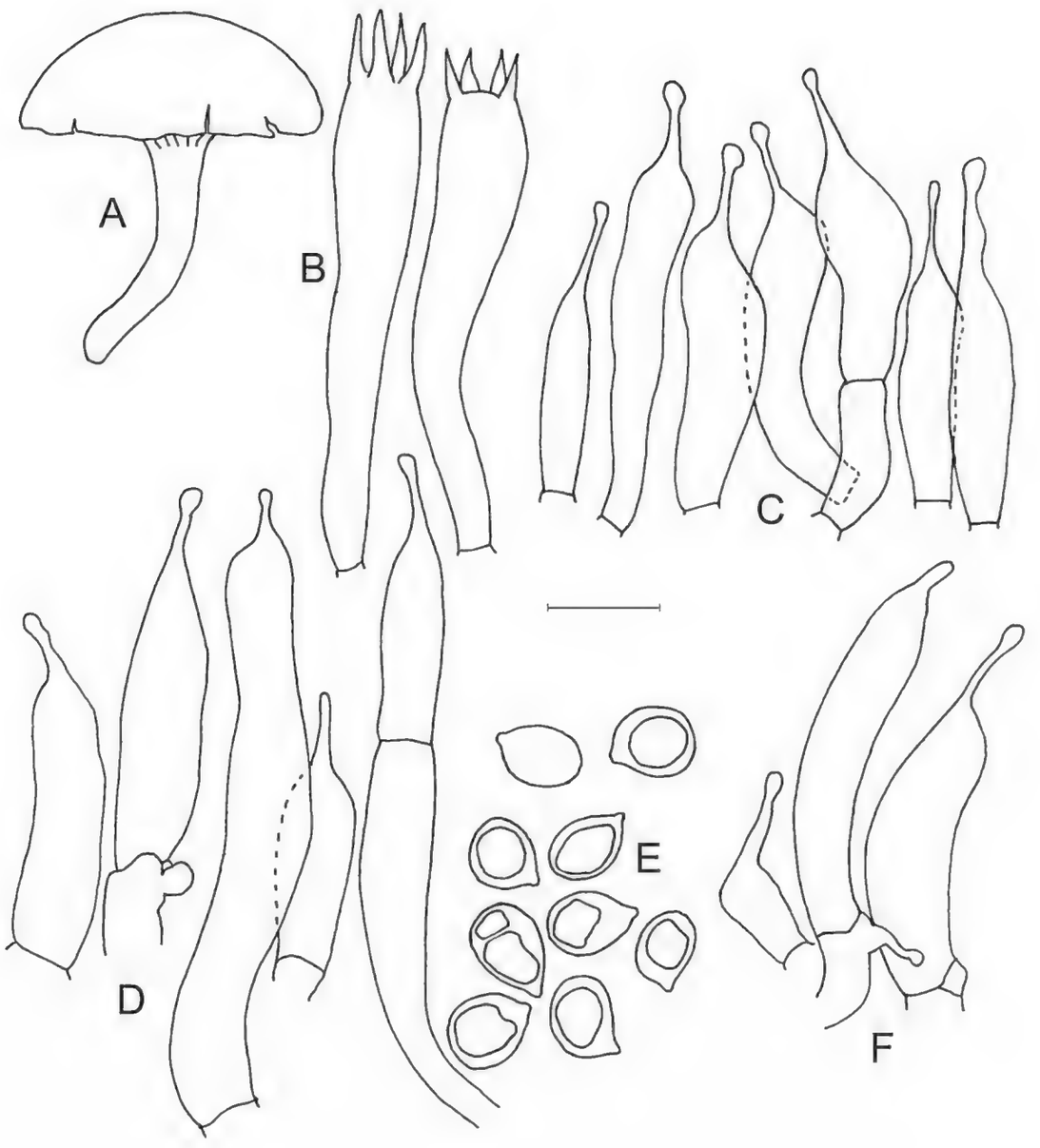

Figure 2, A–F: *Megacollybia virosa*.
A, basidioma; B, basidia; C, cheilocystidia; D, terminal elements of pileipellis hyphae;
E, spores; F, terminal elements of stipitipellis hyphae;
scale bar: 2 cm for basidioma and 10 µm for microscopic structures.

subregular; hyphae 3–15 µm wide, hyaline to pale yellowish, thin-walled, inamyloid. Pileal trama interwoven; hyphae 2–20 µm wide, slightly inflated, hyaline to pale yellowish, thin-walled. Pileipellis mostly a cutis of highly interwoven agglutinated hyphae, occasionally disrupted with trichodermal patches; hyphae 3–10 µm wide, thin- to slightly thick-walled, often with a greyish brown plasmatic pigment; terminal elements cystidioid, 23–85 × 3–10

µm, similar to cheilocystidia in all aspects, often with a greyish brown plasmatic pigment. Stipitipellis a highly disrupted and irregular cutis with agglutinated trichodermal patches of ascending to erect hyphal elements; hyphae 2–21 µm wide, thin- to slightly thick-walled, with grey to dark greyish plasmatic and membrane pigment; terminal elements cystidioid, similar to cheilocystidia in all aspects. Clamp-connections frequent on all hyphae.

Habitat: On soil or on mud walls, often associated with roots of coconut trees, solitary or in caespitose clusters.

Additional collections examined — **INDIA, Kerala State, Calicut District,** Puthiyangadi: 31 July 2005, T.K. Arun Kumar AK373 (TENN63390); 10 August 2005, T.K. Arun Kumar AK378 (TENN63393); 21 June 2006, T.K. Arun Kumar AK397 (TENN63391); **Thiruvananthapuram District,** Plamood: 30 May 1998, C.K. Pradeep 4310 (TENN63385); Vizhinjam: 11 December 2000, C.K. Pradeep 5249 (TENN63386); 23 May 2002, C.K. Pradeep 5526 (TENN63387); Muttada: 9 July 2006, K.B. Vrinda 9804 (TENN63388); 28 August 2006, K.B. Vrinda 9938 (TENN63389).

Discussion: Although the genus *Megacollybia* lacks any unique and spectacular morphological feature that helps in its recognition, based on phylogenetic reconstruction and macro- and micromorphological analyses, Hughes et al. (2007) have identified a set of morphological features common to all the species hitherto recognised in that genus. As this new species has most of those characters (some of which are listed earlier), we assign it to *Megacollybia*. This species is characterised by robust, clitocyboid basidiomata; finely granular, grey-tinted pileus; adnate to decurrent lamellae; white pileal context; thin-walled, ellipsoid to subglobose, inamyloid spores; plentiful cheilocystidia of a unique morphology; cystidioid terminal elements of hyphae of pileipellis; and conspicuous clamp connections. It can be distinguished from all other species of *Megacollybia* owing to its unique cheilocystidia and the terminal elements of the pileipellis.

This species had been collected by the present authors from different parts of Kerala on several occasions in the past but it remained unidentified. Remarkably, in 2006, the last two authors were alerted by a report of a case of mushroom poisoning in a local newspaper. According to this report, a 4-member family got admitted to a local hospital owing to severe gastrointestinal upset after cooking and eating a locally collected mushroom that they considered edible. When the family was discharged from the hospital, with their help, these authors collected basidiomata of the same mushroom from the same locality from where the family had originally collected it. Subsequent studies revealed that this poisonous mushroom was conspecific with the previously collected unidentified species. It seems that this species is rather widely distributed in Kerala State. The robust grey-tinted basidiomata of this species seems to have the capacity to mislead uninitiated people to mistake them for some traditionally eaten species of *Tricholoma* (Fr.) Staude or *Termitomyces* R. Heim.

It seems a streak of toxic nature runs in the genus *Megacollybia*. Basidiomata of *M. platyphylla* are known to cause gastrointestinal irritation (Goos & Shoop 1980, Goos 1984, Spoerke 1994, Barceloux 2008).

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